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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/855,292	05/14/2001	William W. Macy JR.	10559-398001/P10335	1919

8791 7590 10/04/2006

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EXAMINER
ROSARIO, DENNIS

ART UNIT	PAPER NUMBER
2624	

DATE MAILED: 10/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/855,292	MACY, WILLIAM W.	
	Examiner	Art Unit	
	Dennis Rosario	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,6,7,9-13,16,17,19-23,26,27,29,30,32 and 34-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6,7,9-13,16,17,19-23,26,27,29,30,32 and 34-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 May 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment was received on 8/29/2006. Claims 1-3,6,7,9-13,16,17,19-23,26,27,29,30,32 and 34-36 are pending.

Response to Arguments

2. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection of Acharya et al. (US Patent 6,229,578 B1).

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> **The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.**

4. Claims 9,19 and 29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. The term "approximately" in claim 9,19, and 29 is a relative term which renders the claim indefinite. The term "approximately" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

What is the range of approximately with respect to the 8 to 1 ratio? Is the range from 7 to 1 thru 9 to 1? Or 3 to 1 thru 72 to 1?

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1,6,7,11,16,17,21,26,27,32,34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parker et al. (US Patent 5,323,247 A) in view of Sato et al. (cited English translation of JP 403259193 A) and further in view of Apostolopoulos et al. (US Patent 5,850,294 A) and further in view of Acharya et al. (US Patent 6,229,578 B1).

Regarding claim 1, Parker et al. teaches a method of enhancing an image, comprising:

a) first, smoothing the image (Fig. 9, numerals 902 and 904 smoothes or "blur[s]" in col. 18, line 42.) using a filter to produce a smoothed (blurred) image (Note that the blur is mentioned as not being noticeable; however, regardless if the blur is noticeable or not, the blur is still present. Perhaps a user has to look closely in order to notice the blur similar to a halftone image, where a person may have to look closely in order to notice that the image is made of dots.);

b) detecting an edge ("edge detection" in col. 18, line 55) in the smoothed image (Edge detection is performed on an image "with...blurring" in col. 18, line 54.); and

c) performing lowpass filtering ("low pass filter" in col. 18, line 65) on the smoothed image to produce an enhanced image (that "does not contain artifacts" in col. 19, lines 15,16).

Parker et al. does not teach the limitation of the claimed "sharply peaked filter," but does teach using "conversion of binary to gray scale" in col. 18, line 41 that results in a smoothed or blurred image and the method of converting can be modified or "extended" in col. 18, line 43. Thus, Parker et al. suggests to one of ordinary skill in the art that the method of converting from binary to gray scale as taught by Parker et al. can be modified.

Sato et al. teaches a conversion or "converts" in page 4, 2nd to last line from binary to gray scale and a sharply peaked filter as shown in page 6 and 8 of an array of numbers.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Parker et al.'s teaching of converting from binary to gray scale with Sato et al.'s teaching of converting from binary to gray scale, because Sato et al.'s conversion from binary to gray scale is "displayed at a lower cost" on page 10,line 12.

In addition, the combination of Parker et al. does not teach the claimed wherein lowpass filtering is performed using a high frequency cutoff filter only on non-edge areas of the smoothed image as determined by the edge detection. However, Parker et al. of the combination does cite another teaching about lowpass filtering in col. 18, line 62 to col. 19, line 3 that uses "edge detection" in col. 18, line 56. Thus, the combination of Parker et al. suggests to one of ordinary skill in the art to learn lowpass filtering using edge detection from other references. In addition, Parker et al. mentions operations "not associated with edges" in col. 19, line 32, Thus, Parker et al. suggests that the edge detection of col. 18, line 56 is able to distinguish between an edge and not an edge; however, Parker et al. is deficient in any teaching, which would require one of ordinary skill in the art to find a teaching that is able to distinguish between an edge and not an edge in order to carry out the above mentioned operations.

Furthermore, Parker et al. teaches that "blurring...provides an increased capacity for edge detection" in col. 18, lines 55,56. However, Parker is deficient in a teaching of edge detection, which would motivate one of ordinary skill in the art to find a teaching that uses blurring with edge detection.

Apostolopoulos et al. is a reference that teaches lowpass filtering (Fig. 7, num. 87) with edge detection (fig. 7, num. 85 and 86) as suggested by the combination of Parker et al. and teaches the remaining limitation of claim 1 of:

a) wherein lowpass filtering (Fig. 7, num. 87) is performed using a high frequency cutoff filter only on non-edge areas (Fig. 7, label: FALSE EDGES) of the smoothed image (Fig. 7, label: "NON-EDGES" which are smoothed by fig. 7,num. 87 to "update" in col. 8, line 18 the image of fig. 7, num. 85 as mentioned in col. 8, lines 16-22.) as determined by the edge detection.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the combination of Parker et al. with Apostolopoulos et al., because, Apostolopoulos et al.,'s teaching of smoothing with edge detection "reduce[s] distortion" in col. 7, line 66 and would enable the above mentioned operations not associated with edges of Parker et al. to be accomplished.

The combination of Parker et al., Sato et al. and Apostolopoulos et al. still does not teach the last limitation of claim 1 of performing; however, Parker of the combination teaches using a "local statistical based smoothing algorithm" in col. 18, line 58 that corresponds to fig. 9,num. 908 and provides a teaching of using a plurality of filters such as "an adaptive spatial low pass filter" in col. 18, lines 64,65 that uses a "local variance" in col. 18, lines 65,66 and an "additive noise filter" in col. 18, line 66 that uses "Local Statistics" in col. 19, line 1. Thus, Parker et al. suggests to one of ordinary skill in the art that a plurality of filters that use some form of variance or statistics can be used as the filtering step of fig. 9,num. 908.

Acharya et al. teaches one such statistical filter or "a class of filtering...based on...statistics such as the median" in col. 1, lines 30,31 which is shown in fig. 5 and the remaining limitations of claim 1 of:

a) performing a median filtering (fig. 1,num. 160) to the image only on non-edge areas (as indicated on the lower output of fig. 1,num. 140) of the image as determined by the edge detection (fig.1,num. 140).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Parker et al.' s enhanced image and teaching of fig. 9,num. 908 with Acharya et al.'s teaching of fig. 5, because Acharya et al.'s fig. 5 provides an "original pixel space [that] is maintained so that the noise removal process may be iterated...to provide better results" in col. 10, lines 62-64.

Regarding claim 6, Parker et al. of the combination teaches the method of claim 1, wherein detecting the edge comprises:

a) applying an edge filter (fig. 9, num. 908 is referred to as a "filter" in col. 18, line 65 that uses "edge detection" in col. 18, line 56.) to the smoothed image.

Claim 7 is rejected the same as claim 1. Thus, argument similar to that presented above for claim 1 is equally applicable to claim 7.

Claim 11 is rejected the same as claim 1. Thus, argument similar to that presented above for claim 1 is equally applicable to claim 11 except for the limitation of an article as shown in Parker et al., fig. 4,num. 406.

Claim 16 is rejected the same as claim 6. Thus, argument similar to that presented above for claim 6 is equally applicable to claim 16.

Claim 17 is rejected the same as claim 7. Thus, argument similar to that presented above for claim 7 is equally applicable to claim 17 except for the limitation of an article as shown in Parker et al., fig. 4,num. 406.

Claim 21 is rejected the same as claim 1. Thus, argument similar to that presented above for claim 1 is equally applicable to claim 21 except for the limitation of:

a) a memory (Fig. 4,num. 406) that stores executable instructions; and

b) a processor (Fig. 4, num. 405) that executes the instructions.

Claim 26 are rejected the same as claim 6. Thus, argument similar to that presented above for claim 6 is equally applicable to claim 26.

Claim 27 is rejected the same as claims 1 and 21. Thus, argument similar to that presented above for claims 1 and 21 is equally applicable to claim 27.

Claim 32 is rejected the same as claim 6. Thus, argument similar to that presented above for claim 6 is equally applicable to claim 32.

Claim 34 is rejected the same as claims 1 and 6. Thus, argument similar to that presented above for claims 1 and 6 is equally applicable to claim 34.

Regarding claim 35, Parker et al. of the combination teaches the method as recited in claim 1, wherein the method of enhancing an image (Fig. 9) is performed in one pass (Fig. 9 is one pass because the method of claim 9 does not loop back as shown in the figure.).

8. Claims 2 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parker et al. (US Patent 5,323,247 A) in view of Sato et al. (JP 403259193 A) and further in view of Apostolopoulos et al. (US Patent 5,850,294 A) and further in view of Acharya et al. (US Patent 6,229,578 B1) as applied to claim 1, above, and further in view of Gupta et al. (US Patent 5,852,475 A).

Regarding claim 36, the combination of Parker et al. does not teach the limitation of claim 36. However, Parker et al. of the combination does cite another teaching about lowpass filtering in col. 18, line 62 to col. 19, line 3 that uses "edge detection" in col. 18, line 56. Thus, the combination of Parker et al. suggests to one of ordinary skill in the art to learn lowpass filtering using edge detection from other references.

Gupta et al. teaches "low pass filter[ing]" in col. 9, line 48 with edge detection or "pixel classification" in col. 9, line 42 as suggested by Parker et al. of the combination and the remaining limitation of claim 36:

a) comparing a predetermined threshold ("threshold" in col. 12, line 35) with the results ("gradient" in col. 12, line 35) of edge filtering , and

b) wherein edge values determined by the edge filtering that exceed (or is "greater" in col. 12, line 38) the threshold are ignored (or "unchanged" in col. 9, line 46) during lowpass filtering (in col. 9, line 48).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Parker et al.'s teaching that uses low pass filtering with edge detection with Gupta et al.'s teaching of edge detection with low pass filtering, because Gupta et al.'s teaching "prevent[s] edge smearing" in col. 9, line 50.

Regarding claim 2, Parker et al. of the combination teaches the method of claim 1, wherein smoothing comprises:

a) applying a two-dimensional filter ("two-dimensional filter" in col. 18, line 50) to a pixel in the image.

Parker et al. does not teach the remaining limitations of claim 2, but teaches that a two-dimensional filter can be used to "extend" in col. 18, line 50 "one dimensional... processing" in col. 18, line 49. However, Parker et al. does not show how to extend the one-dimensional processing with a two-dimensional filter. Thus, Parker et al. suggests to one of ordinary skill in the art to use a teaching that teaches how to extend one-dimensional processing to two-dimensional processing.

b) storing a pixel processed by the two-dimensional filter in the smoothed image (Fig. 5C, num. 543 processes pixels from "memory" in col. 14, line 44 in order to "replace" in col. 14, line 45 pixels in the memory with pixels that are smoothed with the lowpass filter also referred to as "two-dimensional filter" in col. 14, line 45.); and

c) repeating storing and applying for one or more other pixels in the image (Fig. 5C shows a loop, numerals 543,544,541,542 where the numerals repeatedly performed the claimed storing and applying.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Parker et al.'s teaching of expanding one dimensional processing with Gupta et al.'s teaching of two-dimensional processing as shown in fig. 5C,num. 544, because Gupta et al.'s two-dimensional processing "removes...noise and...artifacts...(col. 21, lines 17,18)" and is "separable...in each direction" in col. 21, lines 7,8. Thus, Parker et al.'s one dimensional processing can be combined to form a two-dimensional processing.

9. Claims 3,12,13,22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parker et al. (US Patent 5,323,247 A) in view of Sato et al. (JP 403259193 A) and further in view of Apostolopoulos et al. (US Patent 5,850,294 A) and further in view of Acharya et al. (US Patent 6,229,578 B1) as applied to claim 1, above, and further in view of Roetling (US Patent5,343,309 A).

Regarding claim 3, Parker et al. of the combination teaches the method of claim 1, wherein lowpass filtering comprises:

a) applying a one-dimensional filter ("filter" in col. 18, line 65) to a pixel in the smoothed ("blurr[ed]" in col. 18, line 55) image.

Parker et al. of the combination does not teach the filter is the claimed one-dimensional filter and the remaining limitations, but does teach that another reference in col. 18, line 67 to col. 19, line 3 teaches filtering of noise with low pass filtering in col. 18, lines 62 to col. 19, line 17. Thus, Parker et al. suggests to one of ordinary skill in the art to find another teaching that teaches low pass filtering of noise.

Roetling teaches lowpass filtering in figure 2, num. 34 of artifacts or "moire" in col. 1, line 43 as suggested by Parker et al. and teaches the remaining limitation of claim 3 of:

a) applying a one-dimensional filter (fig. 2,num. 36 as shown in fig. 4C,num 50) to a pixel in the smoothed image (The output of fig. 2, num. 32 was previously smoothed or lowpass filtered image in fig. 2,num. 36 and passed to fig.2,num. 32 via num. 37.);

b) storing a pixel processed by the one-dimensional filter in the enhanced image (The process of fig. 2, num. 62 corresponds to a printed document or the claimed enhanced image which inherently stores pixels since the document is a sheet of paper.); and

c) repeating storing and applying for one or more other pixels in the smoothed image (When fig. 2 receives more pixels the claimed applying and storing are repeated for each pixel to print objects formed of pixels on a document.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Parker et al.'s teaching of low pass filtering of noise with Roetling's teaching of lowpass filtering of moire, because Fisch's teaching of lowpass filtering of moiré or halftone images provides "better edge smoothing and reduced edge blurring (col. 3, line 44)." .

Claims 12,13,22 and 23 are rejected the same as claim 3. Thus, argument similar to that presented above for claim 3 is equally applicable to claims 12,13,22 and 23.

10. Claims 9,19 and 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Parker et al. (US Patent 5,323,247 A) in view of Sato et al. (cited English translation of JP 403259193 A) and further in view of Apostolopoulos et al. (US Patent 5,850,294 A).

Claim 9 is rejected the same as claim 1. Thus, argument similar to that presented above for claim 1 is equally applicable to claim 9 except for the limitation of:

a) halftoned image (or "halftoned image" which is taught in Parker et al. of the combination in fig. 9, num. 900) and

b) wherein the sharply peaked filter (which is taught by Sato on page 8) comprises:

b1) a matrix of values (as shown on page 8 as a 5 X 5 matrix) where a center value ("72" in the 5 X 5 matrix) has at least approximately an 8 to 1 ratio of a corner value ("1" in the 5 X 5 matrix where the 72 to 1 is interpreted to be at least approximately an 8 to 1 ratio).

Claim 19 is rejected the same as claims 9. Thus, argument similar to that presented above for claim 9 is equally applicable to claim 19 except for the additional limitation as taught in Parker et al. of an article or "computer memory" in the abstract.

Claim 29 is rejected the same as claims 1,9 and 21. Thus, argument similar to that presented above for claims 1,9 and 21 is equally applicable to claim 29.

11. Claims 10,20 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parker et al. (US Patent 5,323,247 A) in view of Sato et al. (JP 403259193 A) and further in view of Apostolopoulos et al. (US Patent 5,850,294 A) as applied to claim 9 and further in view of Tretter (US Patent 5,798,846 A).

Regarding claim 10, Parker et al. of the combination does not teach limitation the last limitation of applying a median filter, but does teach that additional processing (Parker et al., fig. 9, num. 910), which can be "modified" in col. 19, line 41, of "patterns" in col. 19, line 39 is performed after the lowpass filtering (Parker et al., fig. 9,num. 908). Thus, Parker et al. teaches that fig. 9, num. 910 can be modified to process patterns; thus, Parker et al. suggests to one of ordinary skill in the art to find a "con-ventional means" in col. 19, lines 42,43 for processing patterns which can be used to modify fig. 9, num. 910.

Tretter teaches a means or "median filter" in the abstract for processing "patterns" in the abstract as suggested by the combination of Parker et al. and the remaining limitation of claim 9 of:

a) applying a median filter ("median filter" in the abstract) to non-edge areas (or "moiré patterns" in col. 2, lines 44,45 and "preserve straight lines" in col. 2, line 41) of the enhanced image, wherein the median filteris designed to reduce artifacts ("moiré" in the abstract) on the enhanced image.

Tretter does not teach applying a median filter to an enhanced image.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Parker et al.'s teaching of the claimed enhanced image that "does not contain artifacts...associated with low pass operations" in col. 19, lines 15-17 and fig. 9, num. 910 that can be modified to process patterns with Tretter's teaching of the median filter, because Tretter's median filter is able to "minimize the moiré patterns" in the abstract i.e. provides a better "quality" in col. 1, line 50.

Claim 20 is rejected the same as claim 10. Thus, argument similar to that presented above for claim 10 is equally applicable to claim 20.

Claim 30 is rejected the same as claim 10. Thus, argument similar to that presented above for claim 10 is equally applicable to claim 30.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Rosario whose telephone number is (571) 272-7397. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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